

Notice of Allowability	Application No.	Applicant(s)	
	10/015,040	LIU ET AL.	
	Examiner	Art Unit	
	Shawn S. An	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10/3/05 and 1/5/06.
2. ☒ The allowed claim(s) is/are 1-32.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

EXAMINER'S AMENDMENT

1. An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to Applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

IN THE CLAIMS:

A) Please amend claims 1, 5-8, 10-13, 17, 19-20, 22-26, and 28-30 as follows:

1. (Currently amended) A method for determining a scene change in a video sequence during encoding of the video sequence, the method comprising:

receiving a first video frame, a second video frame and a third video frame;

determining a first set of motion vectors between the first video frame and the second video frame and a second set of motion vectors using the third video frame, the motion vectors having magnitudes; and

comparing a ratio of the magnitudes of the first and second sets of motion vectors to a first threshold to determine whether a scene change has occurred, the occurrence of a scene change causing the first frame to be encoded as a different type of frame.

5. (Currently amended) The method of claim 4, wherein comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the first set of motion vectors and the first subset of the second set of motion vectors to the first threshold;

comparing a second ratio of the second subset of the first set of motion vectors and the second subset of the second set of motion vectors to the first threshold; and

determining there is a scene change between the first video frame and second video frame if the first and second ratios are larger than the first threshold.

6. (Currently amended) The method of claim 4, wherein comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

- comparing a first ratio of the first subset of the first set of motion vectors and the first subset of the second set of motion vectors to the first threshold;

- comparing a second ratio of the second subset of the first set of motion vectors and the second subset of the second set of motion vectors to the first threshold; and

- determining there is a scene change between the first video frame and second video frame if the first and second ratios are larger than the first threshold and the sum of the magnitudes of members of the first subset of the first set of motion vectors is greater than a second threshold.

7. (Currently amended) The method of claim 4, wherein if second frame is a P-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

- comparing a first ratio of the first subset of the second set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

- comparing a second ratio of the second subset of the second set of motion vectors and the second subset of the first set of motion vectors to the first threshold; and

- determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold.

8. (Currently amended) The method of claim 4, wherein if the second frame is a P-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

- comparing a first ratio of the first subset of the second set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

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comparing a second ratio of the second subset of the second set of motion vectors and the second subset of the first set of motion vectors to the first threshold; and

determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold and the sum of the magnitudes of members of the first subset of the second set of motion vectors is greater than a second threshold.

10. (Currently amended) The method of claim 9, wherein if the first frame is an I-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the first set of motion vectors and a sum of the first subset of the first set of motion vectors minus the second subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the first subset of the second set of motion vectors and the sum of the first subset of the second set of motion vectors minus the second subset of the second set of motion vectors to the first threshold; and

determining there is a scene change between the first video frame and second video frame if the first and second ratios are larger than the first threshold.

11. (Currently amended) The method of claim 9, wherein if the first frame is an I-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the first set of motion vectors and the sum of the first subset of the first set of motion vectors minus the second subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the first subset of the second set of motion vectors and the sum of the first subset of the second set of motion vectors minus the second subset of the second set of motion vectors to the first threshold; and

determining there is a scene change between the first and second video frame if the first and second ratios are larger than the first threshold and if the sum of magnitudes of members of the first subset of the first set of motion vectors is greater than a second threshold.

12. (Currently amended) The method of claim 9, wherein if the second frame is a B-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the second set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the second subset of the second set of motion vectors and the second subset of the first set of motion vectors to the first threshold;
and

determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold.

13. (Currently amended) The method of claim 9, wherein if the second frame is a B-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the second set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the second subset of the second set of motion vectors and the second subset of the first set of motion vectors to the first threshold;
and

determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold and if a sum of members of the first subset of the second set of motion vectors is larger than a second threshold.

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17. (Currently amended) A video device to encode a video sequence comprising:

an input configured to receive a first video frame, a second video frame, and a third video frame; and

a processor configured to determine a first set of motion vectors between the first video frame and the second video frame and a second set of motion vectors using the third video frame, the motion vectors having magnitudes, and compare a ratio of the magnitudes of the first and second sets of motion vectors to a first threshold to determine whether a scene change has occurred, the occurrence of a scene change causing the first frame to be encoded as a different type of frame.

19. (Currently amended) The video device of claim 18 wherein if second frame is a P-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the second set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the second subset of the second set of motion vectors and the second subset of the first set of motion vectors to the first threshold;
and

determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold.

20. (Currently amended) The video device of claim 18, wherein if the second frame is a P-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the second set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the second subset of the second set of motion vectors and the second subset of the first set of motion vectors to the first threshold;
and

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determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold and the sum of the magnitudes of members of the first subset of the second set of motion vectors is greater than a second threshold.

22. (Currently amended) The video device of claim 17, wherein if the first frame is an I-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the first set of motion vectors and a sum of the first subset of the first set of motion vectors minus the second subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the first subset of the second set of motion vectors and the sum of the first subset of the second set of motion vectors minus the second subset of the second set of motion vectors to the first threshold; and

determining there is a scene change between the first video frame and second video frame if the first and second ratios are larger than the first threshold.

23. (Currently amended) The video device of claim 17, wherein if the first frame is an I-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the first set of motion vectors and the sum of the first subset of the first set of motion vectors minus the second subset of the first set of motion vectors to the first threshold;

comparing a second ratio of the first subset of the second set of motion vectors and the sum of the first subset of the second set of motion vectors minus the second subset of the second set of motion vectors to the first threshold; and

determining there is a scene change between the first and second video frame if the first and second ratios are larger than the first threshold and if the sum of magnitudes of members of the first subset of the first set of motion vectors is greater than a second threshold.

24. (Currently amended) The video device of claim 17, wherein if the first frame is a B-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

- comparing a first ratio of the second subset of the first set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

- comparing a second ratio of the second subset of the second set of motion vectors and the first subset of the second set of motion vectors to the first threshold;
- and

- determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold.

25. (Currently amended) The video device of claim 17, wherein if the first frame is a B-frame, comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

- comparing a first ratio of the second subset of the first set of motion vectors and the first subset of the first set of motion vectors to the first threshold;

- comparing a second ratio of the second subset of the second set of motion vectors and the first subset of the second set of motion vectors to the first threshold;
- and

- determining there is a scene change between the second video frame and third video frame if the first and second ratios are larger than the first threshold and if a sum of members of the second subset of the first set of motion vectors is larger than a second threshold.

26. (Currently amended) A computer readable medium storing executable computer program instructions which, when executed by a processor, cause the processor to perform a method to encode a video sequence comprising:

- receiving a first video frame, a second video frame and a third video frame;

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determining a first set of motion vectors between the first video frame and the second video frame and a second set of motion vectors using the third video frame, the motion vectors having magnitudes; and

comparing a ratio of the magnitudes of the first and second sets of motion vectors to a first threshold to determine whether a scene change has occurred, the occurrence of a scene change causing the first frame to be encoded as a different type of frame.

28. (Currently amended) The computer readable medium as set forth in claim 27, wherein comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the first set of motion vectors and the first subset of the second set of motion vectors to the first threshold;

comparing a second ratio of the second subset of the first set of motion vectors and the second subset of the second set of motion vectors to the first threshold; and

determining there is a scene change between the first video frame and second video frame if the first and second ratios are larger than the first threshold.

29. (Currently amended) The computer readable medium as set forth in claim 27, wherein comparing a ratio of the magnitudes of the first and second sets of motion vectors further comprises:

comparing a first ratio of the first subset of the first set of motion vectors and the first subset of the second set of motion vectors to the first threshold;

comparing a second ratio of the second subset of the first set of motion vectors and the second subset of the second set of motion vectors to the first threshold; and

determining there is a scene change between the first video frame and second video frame if the first and second ratios are larger than the first threshold and the sum of the magnitudes of members of the first subset of the first set of motion vectors is greater than a second threshold.

30. (Currently amended) An apparatus for encoding a video sequence comprising:

means for receiving a first video frame, a second video frame and a third video frame;


means for determining a first set of motion vectors between the first video frame and the second video frame and a second set of motion vectors using the third video frame, the motion vectors having magnitudes; and

means for comparing a ratio of the magnitudes of the first and second sets of motion vectors to a first threshold to determine whether a scene change has occurred, the occurrence of a scene change causing the first frame to be encoded as a different type of frame.

REMARKS:

2. Claims 1, 5-8, 10-13, 17, 19-20, 22-26, and 28-30 have been amended as discussed above, as authorized by Applicants' attorney, Sheryl Sue Holloway (Registration No. 37,850) on January 5, 2006.

3. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to *Shawn S. An* whose telephone number is 571-272-7324.


SHAWN AN
PRIMARY EXAMINER

1/05/06

REASONS for ALLOWANCE

1. Claims 1-32 are allowed after entering the Examiner's Amendment as discussed in the EXAMINER'S AMENDMENT section.

2. Claims 1-32 as amended comprises novel features, wherein the prior art of record fails to anticipate or make obvious the novel features (greater emphasis added on amended claim limitations)

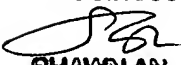
Any comments considered necessary by Applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to *Shawn S. An* whose telephone number is 571-272-7324.

4. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


SHAWN AN
PRIMARY EXAMINER

1/05/06